Microspacecraft Attitude Control

George T. Sevaston

Jet Propulsion Laboratory,
California Institute of Technology
Pasadena, CA 91109

ABSTRACT

The essential requirement on a microspacecraft attitude control subsystem (ACS) is that it must provide a means of affecting the orientation of the spacecraft bus. Thus, it must be capable of delivering adequate torque for some finite interval of time through appropriate actuators. This clearly limits the applicable technologies and the degree to which certain key components can be miniaturized. Beside actuators, other basic components include sensors, electronics and a command and data subsystem interface. Depending on the choice of realization and the desired level of onboard autonomy, a computer may also be included. In the case of the sensors, accuracy capabilities are governed by the allowable size and mass of the package. In the case of the computer, power, as well as size and mass are limiting. The expected ACS subsystem requirements of a generic microspacecraft will be examined. These will then be discussed in the context of what is both feasible and technologically achievable. Fundamental limits and major development needs will be identified.